

What is claimed is:

1. An ink-jet recording apparatus, which has a recording head that ejects ink from an ink reservoir and driving signal generating means that generates a driving signal for ejecting ink droplets, comprising:
  - ink reservation amount obtaining means for obtaining the ink reservation amount in said ink reservoir;
  - temperature change amount obtaining means for obtaining the temperature change amount of said recording head; and
  - ink consumption amount controlling means for controlling the ink consumption amount of said recording head based on the temperature change amount of the recording head obtained by both said temperature change amount obtaining means and the ink reservation amount obtained by said ink reservation amount obtaining means.
2. The ink-jet recording apparatus according to claim 1, wherein the ink consumption amount controlled by said ink consumption amount controlling means is the ink consumption amount by ink ejection and preparatory ejection.
3. The ink-jet recording apparatus according to claim 2, wherein the ink consumption amount controlled by said ink consumption amount controlling means further includes the ink consumption amount by a sucking operation.
4. The ink-jet recording apparatus according to claim 1, wherein said ink reservation amount obtaining means detects the ink consumption amount and obtains the ink reservation amount in said ink reservoir.
5. The ink-jet recording apparatus according to claim 4, wherein the ink consumption amount detected by said ink reservation amount obtaining means is the ejected amount of ink in a recording operation, the ejected amount of ink in a preparatory ejection operation and the sucked amount of ink in a sucking operation.
6. The ink-jet recording apparatus according to claim 1, wherein said temperature change amount obtaining means comprises temperature detecting means for detecting the temperature of the recording head and temperature information storing means for storing the head temperature information from the temperature detecting means.
7. The ink-jet recording apparatus according to claim 6, wherein said temperature information storing means stores the recording head temperature information from the time when a power source is turned on.

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8. The ink-jet recording apparatus according to claim 6, wherein said temperature information storing means stores the head temperature information in the waiting state of the recording operation.

9. The ink-jet recording apparatus according to claim 6, wherein said temperature information storing means holds the stored head temperature information even after the power source is turned off.

10. The ink-jet recording apparatus according to claim 9, wherein said temperature change amount obtaining means obtains the temperature change amount by using the head temperature information held in the temperature information storing means when the power source is turned on again within a specified time after power source is turned off.

11. The ink-jet recording apparatus according to claim 1, wherein said driving signal generating means generates a driving signal that makes the recording head perform a recording operation, and said ink consumption amount controlling means adjusts the driving signal for the recording operation.

12. The ink-jet recording apparatus according to claim 11, wherein said driving signal generating means generates the driving signal including the driving pulse for ejecting ink droplets, and said ink consumption amount controlling means adjusts the driving voltage of the driving pulse based on the temperature change amount and the ink reservation amount.

13. The ink-jet recording apparatus according to claim 11, wherein said driving signal generating means generates the driving signal including the driving pulse for ejecting ink droplets, and said ink consumption amount controlling means adjusts the pulse form of the driving pulse based on the temperature change amount and the ink reservation amount.

14. The ink-jet recording apparatus according to claim 11, wherein said recording head performs a preparatory ejection operation by using the driving signal of the recording operation.

15. The ink-jet recording apparatus according to claim 1, wherein said ink consumption amount controlling means adjusts control of the preparatory ejection operation.

16. The ink-jet recording apparatus according to claim 15, wherein said ink consumption amount controlling means adjusts the pulse form for the ejection in said preparatory ejection operation.

17. The ink-jet recording apparatus according to claim 15, wherein said ink

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consumption amount controlling means adjusts the number of ejections in one preparatory ejection operation.

18. The ink-jet recording apparatus according to claim 15, wherein said ink consumption amount controlling means adjusts the interval of said preparatory ejection operation.

19. The ink-jet recording apparatus according to claim 15, wherein said ink consumption amount controlling means adjusts the ejection cycle in said preparatory ejection operation.

20. The ink-jet recording apparatus according to claim 1, further comprising:  
micro-vibration drive controlling means for making ink in said recording head perform micro-vibration; and

changing means for adjusting control of the micro-vibration drive controlling means based on the temperature change amount of the recording head obtained by said temperature change amount obtaining means and the ink reservation amount obtained by said ink reservation amount obtaining means.

21. The ink-jet recording apparatus according to claim 20, wherein said changing means adjusts the pulse form for the micro-vibration in said micro-vibration drive.

22. The ink-jet recording apparatus according to claim 20, wherein said changing means adjusts the pulse number of said micro-vibration drive.

23. The ink-jet recording apparatus according to claim 20, wherein said changing means adjusts the drive interval of said micro-vibration drive.

24. The ink-jet recording apparatus according to claim 20, wherein said changing means adjusts the drive cycle of said micro-vibration drive.

25. An ink-jet recording method, in which the ink-jet recording apparatus has a recording head for ejecting ink from an ink reservoir and driving signal generating means for generating a driving signal to eject ink droplets, the method comprising the steps of:

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obtaining the ink reservation amount in said ink reservoir and  
obtaining the temperature change amount of said recording head;  
and

controlling the ink consumption amount of said recording head based  
on the temperature change amount of said recording head and said ink  
reservation amount.

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26. The ink-jet recording method according to claim 25, wherein in said step

of controlling of the ink consumption amount, the ink consumption amount due to ink ejection and preparatory ejection is controlled.

27. The ink-jet recording method according to claim 26, wherein in said step of controlling the ink consumption amount, the ink consumption amount due to a sucking operation is further controlled.

28. The ink-jet recording method according to claim 25, wherein said ink reservation amount is obtained by calculation based on totalization of the ink consumption amount.

29. The ink-jet recording method according to claim 28, wherein said ink consumption amount is the ink ejection amount in the recording operation, the ink ejection amount in the preparatory ejection operation, and the ink sucking amount in the sucking operation.

30. The ink-jet recording method according to claim 25, wherein said step of obtaining a temperature change amount of a recording head comprises the steps of:

detecting the temperature of said recording head; and  
storing the detected head temperature information.

31. The ink-jet recording method according to claim 30, wherein in said step of storing head temperature information, the head temperature information from the time when the power source is turned on is stored.

32. The ink-jet recording method according to claim 30, wherein in said step of storing the head temperature information, the head temperature information in the waiting state of the recording operation is stored.

33. The ink-jet recording method according to claim 30, wherein in said step of storing head temperature information, the stored head temperature information is held even after the power source is turned off.

34. The ink-jet recording method according to claim 33, wherein in said step of obtaining the temperature change amount of the recording head, the temperature change amount is obtained by using the head temperature information held in the temperature information storing means, when the power source is turned on again within a specified time after the power source is turned off.

35. The ink-jet recording method according to claim 25, wherein in said step of controlling the ink consumption amount, the driving signal that makes said recording head perform the recording operation is adjusted.

36. The ink-jet recording method according to claim 35, wherein said

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adjustment of the driving signal of the recording operation is adjustment of the driving voltage for the pulse form, which is included in the driving signal for ejecting ink droplets.

37. The ink-jet recording method according to claim 35, wherein said adjustment of the driving signal of the recording operation is adjustment of the pulse form of the driving pulse, which is included in the driving signal for ejecting ink droplets.

38. The ink-jet recording method according to claim 35, wherein said recording head is made to perform the preparatory ejection operation by using the driving signal of the adjusted recording operation.

39. The ink-jet recording method according to claim 25, wherein in said step of controlling the ink consumption amount, the driving signal for performing the preparatory ejection operation is adjusted.

40. The ink-jet recording method according to claim 39, wherein said adjustment of the driving signal for the preparatory ejection operation is adjustment of the pulse form for the ejection in said preparatory ejection operation.

41. The ink-jet recording method according to claim 39, wherein said adjustment of the driving signal for the preparatory ejection operation is adjustment of the number of ejections in said preparatory ejection operation.

42. The ink-jet recording method according to claim 39, wherein said adjustment of the driving signal for said preparatory ejection operation is adjustment of the interval of said preparatory ejection operation.

43. The ink-jet recording method according to claim 39, wherein said adjustment of the driving signal for said preparatory ejection operation is change of the ejection cycle in said preparatory ejection operation.

44. The ink-jet recording method according to claim 25, further comprising a step of adjusting the driving signal that makes the recording head perform micro-vibration.

45. The ink-jet recording method according to claim 44, wherein said adjustment of the driving signal for performing said micro-vibration drive is adjustment of the pulse form for the micro-vibration in said micro-vibration drive.

46. The ink-jet recording method according to claim 44, wherein said adjustment of the driving signal for performing said micro-vibration drive is adjustment of the pulse number of said micro-vibration drive.

47. The ink-jet recording method according to claim 44, wherein said adjustment of the driving signal for performing said micro-vibration drive is adjustment of the driving interval of said driving signal.

48. The ink-jet recording method according to claim 44, wherein the adjustment of the driving signal for performing said micro-vibration drive is adjustment of the driving cycle of said micro-vibration drive.

49. A recording medium capable of being read by a computer, which stores a program for controlling the ink consumption amount of the ink-jet recording apparatus executing printing by using a recording head ejecting ink from an ink reservoir,

wherein said program makes the ink-jet recording method obtain the ink reservation amount in said ink reservoir and the temperature change amount of said recording head, and control the ink consumption amount of the recording head based on the temperature change amount of said recording head and said ink reservation amount.

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